

Serial No.: 10/642,852

### **Amendments to the Specification**

Please replace the paragraph beginning at Page 7, line 20 of the subject application with the following amended paragraph:

In a conventional polymer electrolyte membrane fuel cell, the electrolyte 10 is a solid polymer membrane disposed between the anode electrode 11 and the cathode electrode 12, as shown in Fig. 1. The electrodes comprise a current collector/gas diffusion layer 13, 14, which may be made of carbon cloth, and disposed between the gas diffusion layers 13, 14 and the solid polymer electrolyte membrane 10 is a catalyst layer 15, 16 which may be applied directly on the gas diffusion layer or on the solid polymer membrane. The catalyst layer 15, 16, typically applied as a catalyst ink, is typically constructed of a plurality of catalyst particles 17 bound together by a binder material 18, typically NAFION, a sulfonated tetrafluoroethylene copolymer, which is proton conductive but not electronically conductive.

Please replace the paragraph beginning at Page 8, line 8 of the subject application with the following amended paragraph:

Catalyst inks are prepared by dispersing catalyst particles in a solubilized ionomer, which acts as a binder. In one method, the very thin film catalyst layers are transferred from decals consisting of TEFLON® (polytetrafluoroethylene) sheet with baked on catalyst ink. The binder must be stable and ionically (e.g. proton) conductive. Because conventional binders are not electronically conductive, requiring “electron tunneling” through the binder layer as shown in Fig. 2A, the electron path resistance increases with distance from the current collector. The ionic resistance also increases with distance from the NAFION/catalyst interface. Extending the electrolyte layer deeper into the catalyst layer minimizes the ionic resistance. Thus, even with adequate mass transport of reactant gas to the catalytic layer, a limiting factor is the transport of electrons from catalytic particles distant from the current collector.